NEED TO KNOW

a national security newsletter

Volume 1, Number 1 October 2000

State of the Division

Laurin Dodd,
Associate Laboratory Director, National Security

It has been one year since the National Security Division was created. We have accomplished much during the year and the outlook is excellent for this next year. It is fitting that the anniversary is marked with the issue of our first newsletter.

Thanks to all of you for your efforts to manage the unexpected challenges of FY00 (including the October, 1999 LDRD surprise and travel restrictions) as well as your significant work that has enabled us to meet the organizational and mission goals that we set with our DOE-ID client.

We have made steady progress towards achieving our strategic goals during the year. In addition to enhancing our reputation for delivering quality

See **Dodd**, *page 6*

The Road to WIPP—A Cyber Journey

A year ago, it took a stack of paper hundreds of sheets high to authorize the movement of one drum of transuranic waste to the Waste Isolation Pilot Plant (WIPP).

Just a short year ago, most of this information was tracked via paper-based systems — dozens and dozens of them. A year ago, data could be changed by most anyone within the process, almost anytime in the process. But all of that changed with the advent of the Transuranic Reporting, Inventory and Processing System (TRIPS).

TRIPS is a customized computer database tool developed by the INEEL's Advanced Information Systems to effectively manage the data generation, modification, and review processes necessary for the Laboratory to ship transuranic waste to WIPP. And it is near paperless.

Paperless doesn't mean simple. TRIPS currently contains 171 data collection tables, 104 audit

See **TRIPS**, *page 2*

INEEL
Idaho National Engineering & Environmental Laboratory

TRIPS *(continued from page 1)*

tables, and 137 reference data tables with over 2 million reference data elements.

But the process wasn't simple to start with, and now TRIPS provides an electronic format to track waste containers, analyze waste characterization, validate data, certify containers and configure the final payload for shipment. TRIPS does this while adhering the myriad rules and regulations issued by WIPP, the states of Idaho and New Mexico and the INEEL itself.

Out at the Stored Waste Examination Pilot Plant (SWEPP), Senior Operator Craig Muehleip and Apprentice Lashell Alade use TRIPS to input data generated from the drum inspections while Quality Inspector Jim Osborne looks on (top). In a later step in the process, Dale Simpson independently reviews the TRIPS data (above). These and many other processes must occur before the waste is packaged and ready for inspection by Tom Wright, Idaho State Police (right).

Two Purposes

When the system was first conceived in 1996, there were two major objectives – reduce the amount of paper and guarantee data integrity. TRIPS meets these objectives almost too well.

"The TRIPS team did exactly what they were asked to do - make data integrity the number one priority." said Tom Monk, manager of the 3100 m^3 project at the RWMC.

That means when data needs to be changed down the road in the process, the "paperwork" must start again from the beginning. Every individual who reviewed and approved the data must re-review and concur with the changes. And that can be difficult to swallow for a program that is under such a time crunch.

But TRIPS does guarantee the data integrity, a significant issue in maintaining the WIPP certification required to ship waste to New Mexico. Earlier in the year, the certification was withdrawn in part, due to flaws in paper documentation. TRIPS checks, double-checks and flags possible discrepancies in information, making TRIPS a powerful tool for trained and knowledgeable operators and validators to use.

Eliminating the hundreds and hundreds of pieces of paper also goes a long way to ensure valid data. Errors from misplaced checklists to transposed numbers were possible in the paper process but impossible with TRIPS.

Electronic Signature

A notable feature in TRIPS is the "electronic signature" which is a legal substitute for the pen and paper handwritten signature. This is not a scanned image or time-stamped user ID transmitted electronically, but the binding of a user's identity with the actual data being signed using advanced cryptographic technology.

TRIPS Team, from left to right

Front row: *Rich Oesterling, "Breaker" Bob Evans, Greg Miller, John Jenkins, Ken Housley, Rita Wells, Nola Orr, Diane Hartley, Dale Christiansen, Steve Schaeffer, Stella Martinez-Piper, Toni Austin–AIS department manager, Ron Larson, Kurt Wagner*

Back row: *Dave Velloff, Ray Fink, Stacie Horman, Bobbie Larsen, Dennis Hollenbeck, Scott Bauer, Catherine Herring, Clair Smith, Lynda Taleb, Kevin Cook, Karen Conlon-Empey, Ray Johnson, Kimberly Boyd, Steve Teller, Linda Merrick, Bev Novak, Wayne Boyer, Wayne Austad, Barb Peterson–TRIPS project manager, Mark Hughes, Susan Krusch, Dan Berrett, Dave Spencer, Ellen Aoki, Eric Yarger*

Missing from the photo are Gay Gilbert, Carol Mancuso, Catherine Salazar, Wyn Schwendiman and Dale Cook.

An individual's identity is established through the combination of a "smart card" and a Personal Identification Number which activates the crypto processor on the card. For example, once a validator completes a checklist, he or she "signs" the form by inserting their smart card into a workstation, clicking the "sign data" button, entering their PIN, and accepting the completed signature. The data package is then routed on to the next "in-box" in the process.

Without this electronic signature capability, every automated process would be reduced to a paper approval with the inherent flaws in any paper process such as transposed numbers and even mislaid forms. With some drums producing an equivalent of up to 500-1000 pages per drum, manual data and signature verification would be an enormous burden.

The electronic signature in itself is not leading-edge technology. The Internet and banking industry have used electronic signatures for some time. But what these commercial entities use - while electronic - is still similar to the paper signature concept in that the signature is attached to a specific digital file. One file, one signature.

What makes TRIPS so unique is that the data on the form a user "signs" is stored on multiple databases in multiple locations on a computer disk. The user "sees" and "signs" the form on the screen. But the TRIPS technology aligns that signature with all the applicable data stored in the database tables scattered throughout the system.

An electronic file or "snapshot" is created at the time of each electronic signature and compared to current data at multiple steps in the process. If the information no longer matches, TRIPS flags all affected data and restricts further approvals of that data set until the discrepancy has been resolved. So what someone "signs" remains unchangeable without the person's review and concurrence.

The electronic signature was key to TRIPS' approval from WIPP and is a significant example of integrating the research and development capabilities of the INEEL with the needs of operations. According to Monk, the electronic signature feature is probably the best in the country.

With over 40,000 signatures currently stored on TRIPS, it is one of the most complex digital signature applications and one of the few production uses of smart cards within the Department of Energy. Stories on this unique INEEL technology have

See **TRIPS**, *page 4*

TRIPS *(continued from page 3)*

appeared in the Wall Street Journal, computer security magazines and an upcoming book titled "Public Key Infrastructures (PKI) Essentials." The designers have submitted a patent, which is currently pending.

Process design

TRIPS was designed to mirror and support the existing physical processes required to certify a drum for shipment including data generation, container management, data validation, certification, transportation and electronic data transfer to the WIPP Waste Information System.

But what both the systems designers and the process owners will admit is that TRIPS would have benefited from delaying development months or even a year down the line. When TRIPS was being planned, final Resource Conservation and Recovery Act (RCRA) requirements were not established for WIPP, and the RWMC was far from its current production role and schedule. According to Barb Peterson, TRIPS project manager, the hardest part for the team was getting their arms around the constantly changing RCRA requirements and WIPP regulatory constraints, not the actual programming.

But managers of the Transuranic Waste Program believed that without an automated system ready to go, they would never be able to meet the aggressive schedule contained in the settlement agreement, so development was started.

Quality Testing

Meeting changing regulatory and legal requirements was not only a development challenge, it was a testing challenge as well. The TRIPS project assembled an independent Software Quality Assurance/Testing group to provide planned, systematic assessment of TRIPS functionality as compared to the design, user requirements and regulatory demands. The testing program was subject to an in-depth audit by DOE and Environmental Protection Agency representatives. Testing had to meet Nuclear Quality Assurance and Institute of Electrical and Electronic Engineering standards and DOE-Carlsbad Area Office quality assurance program requirements without impacting the aggressive 3100 m^3 project schedule. This forced the testing team to develop methodologies and skills that are both formal and standardized yet remain flexible. These methodologies already are being transferred to other software development activities.

Toni Austin, department manager of Advanced Information Systems said some of TRIPS' growing pains are a response to the realities of production versus a pilot program. "We're only midway through the journey. The journey really ends when all 3,100 m^3 leaves the Site."

Until then, the TRIPS team continues to support this major INEEL project, with dedication and long hours.

"They are very, very responsive," says Monk. "People have worked through the night to ensure this was up and running when we needed it."

The team continues to refine TRIPS, arguably, the most complex computer application on Site—adding production fixes, incorporating new requirements—and creating new reporting capabilities. They continue their commitment to the project with the knowledge and sense of achievement that TRIPS is an integral part of each new shipment heading to WIPP.

For more information on TRIPS, go to http://trips/.

Advanced Threat Mitigation Systems – Solving Threats Against the Nation

Bill Motes doesn't want much for the Advanced Threat Mitigation Directorate, only for it to be recognized as the first and best source for solutions to threats against the nation. Motes talked about his vision and plan for the organization and the near- and long-term investments that are being made to get there.

Bill Motes
Advanced Threat Mitigation Systems

"I want this National Security directorate to be the primary resource of unique and innovative solutions to national security problems. Problems addressing detection, prevention and mitigation of threats to the general public, the Warfighter, infrastructure or environment,

especially in the areas of counter-terrorism, law enforcement, command and control, demilitarization and information sciences."

'It's not enough to just have programs; we want to have the recognition – recognition based on providing innovative, cost-effective solutions to problems. Integrated defense systems is starting to get there. We're known around the Complex and around the country as the place to go for effective solutions in 'chem demil' and command and control applications. And programs such as Mobile Munitions Assessment System and Air Support Operations Center have gotten us there.

"But I want that same recognition for our efforts in counter-terrorism, law enforcement, and advanced information systems. And one way we do it is through investments. Over the next few years, we will be heavily investing in several areas including the Site-wide initiative, Critical Infrastructure Protection. This initiative includes components of law enforcement, counter-terrorism, advanced information and energy systems. Other important areas for investment are Information Protection and Security and our major existing business base, Integrated Defense Systems."

Investment Sources

Motes laid out the sources and purposes of the different investments. Major sources include mission development and Laboratory Directed Research and Development (LDRD) funding. According to Motes, mission development funds will be used to identify the customer needs and define the concepts for fulfilling those needs. The next phase, still using mission development funding, is to market those capabilities by developing concepts, giving briefings and writing proposals, all to show the customer what we can do to fulfill their needs.

Mission development efforts are complemented by the investments in technology made through LDRD funding. Planning includes identifying and projecting technology needs one to five years down the road to provide the proof of concept and prototype.

"We're going to be investing in our baseline business," said Motes. "We want to continue and enhance our existing programs but also take them into new areas, such as the international arena for integrated defense systems.

"But a real focus for the INEEL will be in Critical Infrastructure Protection and that encompasses a very large range of programs and not just in National Security but also in Energy and Information Technologies."

Another source of investment in technology development is private sector or university collaborations. A good example is the University of Idaho collaboration on cyber security and the work tailored towards system survivability.

These investments are not made solely on the basis of obtaining or increasing the external customer base. Much of the research accomplished and planned will support cleanup operations around the Site and the major INEEL thrust in the subsurface arena.

2001 Goals

Motes lists the major goals for the organization in 2001.

- Develop a significant externally funded business base in information technologies – particularly cyber security applications.
- Enhance the INEEL role in the DOE Critical Infrastructure Program and expand participation into other governmental agency areas.
- Expand the command and control program area to new customer bases.
- Become a member of the system of national Crime Technology Centers.
- Expand international presence in "chem demil" through participation in a National Laboratory Consortium for supporting recovery operations in programs such as the emerging Japan/China activity.

"What we want to accomplish here is near-term. Recognition is long-term. We can be successful and improve our business base to a significant level. I'd like to see our annual budget at $50M. But to do that, we'll need more major programs, like ASOC and 'chem demil.'

"And how will we get there? Through successfully delivering superior projects, effective strategic planning and judicious investments in the future."

The INEEL is the place to go for 'chem demil' and command and control applications thanks to the Mobile Munitions Assessment System and the Air Support Operations Center.

Way to Go!

Management nominated two National Security programs to receive the Spirit of Excellence Award.

Jack Way, Ron Bernier, Bonnie Hong, Lori Williamson and Lisa Holverson of the BBWI Counterintelligence Program were nominated for their efforts in preparing for and hosting an intensive program audit. The submission stated that the few findings, unparalleled among most DOE sites, presented strong evidence of the success of their hard work. BBWI executive management agreed, and the group was awarded plaques for their efforts.

The TRIPS team was also nominated in recognition of their work in developing TRIPS and overall support to the 3100 m^3 project. While senior management concurred, they also felt the members were truly part of the overall project team and invited them to celebrate achievement of the 96 m^3 shipment milestone with all of the Radioactive Waste Management Complex.

Much of the recognition for a job well done comes directly from the National Security customers. Here is a sprinkling of recent comments received.

From Edward Curran, Director, Office of Counterintelligence regarding Bonnie Hong

> "Bonnie…gave an absolutely outstanding performance as she augmented the Office of Counterintelligence headquarters staff… Ms. Hong's exceptional personal drive, dedication, and organizational skill have benefited the counterintelligence mission of every major Department of Energy site."

From Major Kirk M. Neil, USAF, Joint Aerospace Applications Division, Global Command and Control System Intelligence regarding Mike Snyder, Kurt Welker, Lance Murri, Dave Harker and Jerry Scott

> "…Please pass my thanks and appreciation for elegant code and superb user interface to your team."

From Lorie Cahn, Public Affairs Liaison, Jackson, WY INEEL Office regarding Kevin Young

> "…thanks for the stupendous job you did at the Colter Elementary school…Your presentation on satellites and rockets was so well done and creative. I have received tremendously positive response from the students, teachers, and administrators and they would love to have you back…"

From Steve Bird, U.S. Army, P/M Non-Stockpile regarding Gus Caffrey, Ken Krebs, Brian Harlow, Andy Edwards, Donna Marts and John Zabriskie

> "The INEEL PINS Team has provided an excellent service, on-time, within cost and schedule…the team is flexible, available, timely, professional and innovative. They are routinely asked to work weekends, after work hours, holidays, maintain ridiculous travel schedules and always show up prepared to work. Excellent Team."

Dodd (continued from page 1)

products within schedule and budgets, we have

- Significantly increased our visibility with our national security client base in Washington D.C.;
- Contributed toward achieving the site environmental mission;
- Developed and are pursuing two major initiatives (International Center for Environmental Safety and Critical Infrastructure Protection);
- Increased our business base in targeted areas; and
- Increased strategic collaborations with universities and other laboratories.

Our projected business base for this year looks good. A major challenges will be to achieve a real growth rate of 5% in base business at the same time that we are managing robust LDRD and Corporate Funded Research and Development (CFRD) programs. The internally funded R&D efforts should position us for growth in future years but we cannot allow them to substitute for growth in our externally funded business.

This first newsletter highlights some of the staff and programmatic achievements during the last 12 months. It is the first of what is planned to be a periodic publication that is intended to help keep us all informed of events and accomplishments within the Division. Thanks much to Kathy Gatens for making this happen and for all of her efforts during the last year supporting our communications needs. She will welcome any suggestions you give her for future editions of our newsletter.

National Security Employee Patents

Fiscal Year 2000 saw a record number of patents submitted by and awarded to National Security employees and program contributors. The check presentations became almost a regular agenda item at R&D staff meetings where individual inventors were introduced and their accomplishments recognized. The benefits of these achievements, however, go far beyond the borders of the Division or even the INEEL. Many of these patents have applications to the national and international scientific community. Congratulations to these employees.

Doug Akers, Arthur Denison
"In-situ Positron Annihilation Analysis for Fatigue and Embrittlement"

Dennis Bingham, Bruce Wilding, Michael McKellar
"Apparatus and Process for the Refrigeration, Liquefaction and Separation of Gases with Varying Levels of Purity"

Dennis Bingham
"Apparatus for Pumping Liquids at or Below Boiling Point"

Dennis Bingham, Reed L. Hoskinson, John M. Svoboda, J. Richard Hess
"Systems and Methods for Autonomously Controlling Agricultural Machinery"

Gus Caffrey, Ken Krebs
"PINS Chemical Identification Software"

Catherine Herring, Wayne Austad, Ben Groeneveld, Stuart Walsh
"Digital Signature System with Non-Repudiation for Relational Databases"

Greg Lancaster, William Reagen, Judy Partin, Glenn Moore
"Method for the Detection of Nitro-Containing Composition Using Ultraviolet Photolysis"

Greg Lancaster, Ann Marie Smith, Bradley Gardner, Kevin Kostelnik, Judy Partin, M. Catherine Pfeifer
"Sensor System for Buried Waste Containment Sites"

Michael O'Brien, Arnold Erickson
"Process and Material that Encapsulates Solid Hazardous Waste"

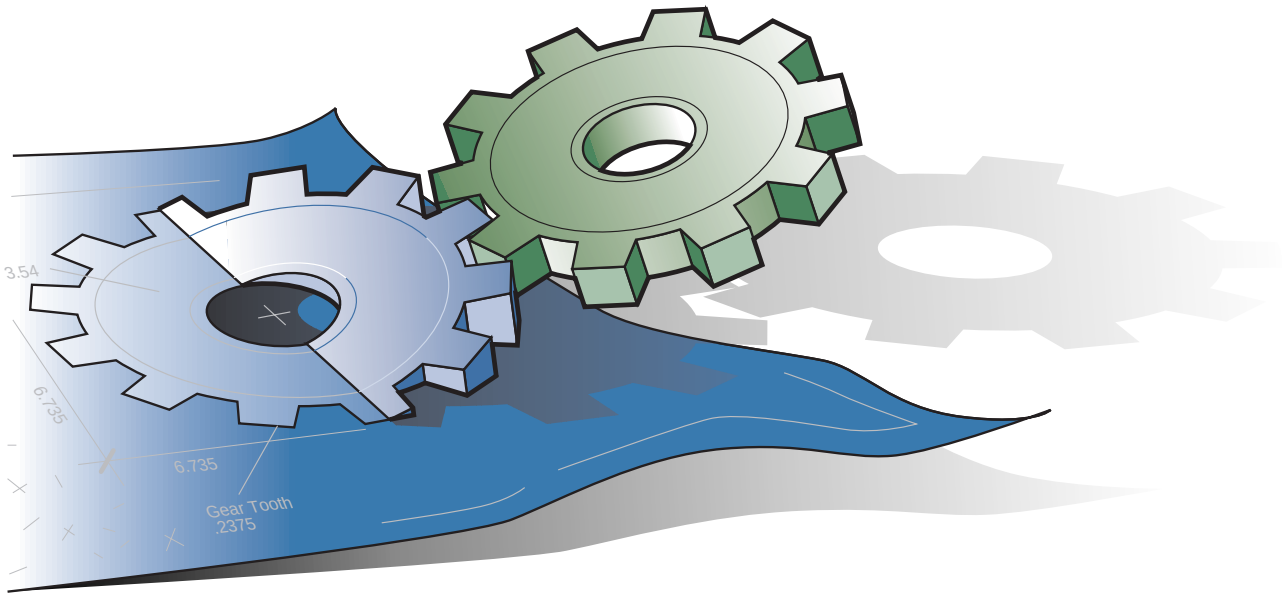
Mark Stone, Christopher Orme, Eric Peterson
"Method for Producing a Selectively Permeable Separation Module"

John Svoboda, John Slater
"Real-Time Data Acquisition and Telemetry Based Irrigation Control System"

John Svoboda, Reed Hoskinson, J. Richard Hess
"Measuring Spatial Variability in Soil Characterization"

John Svoboda
"Radio Area Network for Field Deployed Information/ Computer Systems"

Curt Wilkins, Robert Evans
"Non-Intrusive Device for Two-Phase Flow Measurement in Steam/Water Mixtures"



Scorecard for Success – The Performance Evaluation Measurement Plan

What is success and how do you measure it?

If you are a professional baseball team, success is winning the World Series. If you are a small business, you may measure success in annually increasing profits. But what if you are the Idaho National Engineering and Environmental Laboratory? How then is your success measured?

In part, it's measured by the completion of Critical Objectives outlined in the Performance Evaluation Measurement Plan (PEMP).

In the past, contractors were measured and paid by the Department of Energy through the CPAF or award fee. This process often became very subjective, with disagreements or misunderstandings relative to "how good was good", resulting in lower fees and dissatisfied customers.

The PEMP outlines a radically different, yet objective approach and does this while reflecting the considerable planning and vision of the Institutional Plan.

The PEMP lists five Critical Outcomes that cross boundaries and organizations, requiring an institutional rather than departmental response. The Critical Outcomes, which must be accomplished over the five years of the contract, are Operational Excellence, Mission Accomplishment, Integrate R&D with Operations, INEEL Revitalization, and Leadership.

If the PEMP stopped there, it wouldn't differ significantly from the broad and sometimes ambiguous award fee guidelines. But the PEMP goes much further and details specific and measurable objectives, appoints DOE and INEEL owners and even lists the maximum available fee.

For example, within the Critical Outcome area of Mission Accomplishment is the very specific 2.2.5.3 Measure, "Begin programmatic use of the Material Science Laboratory by April 1, 2001." The basis for validation, projects funded by DOE or National Security Work-for-Others customers, is included along with who is accountable for INEEL and DOE, and the potential fee. Cut and dried, in black and white.

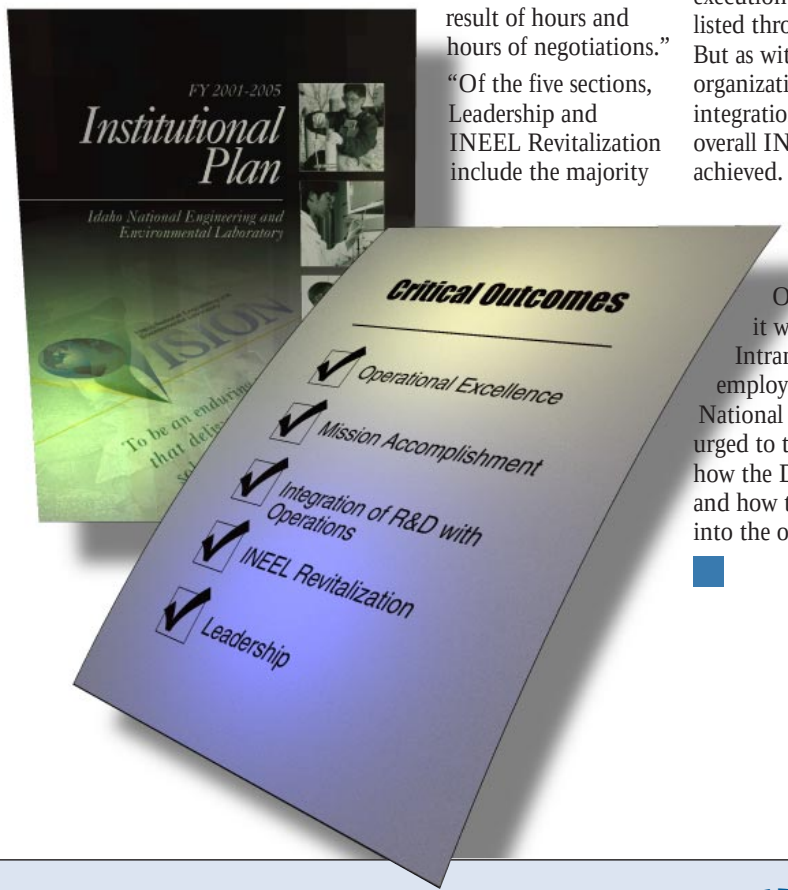
"One of the major benefits I see is the alignment of measures and criteria with the Institutional Plan and the agreement on those measures between DOE and the INEEL," says Rafael Soto, responsible for coordinating the PEMP process and reporting for R&D. "This is the result of hours and hours of negotiations."

"Of the five sections, Leadership and INEEL Revitalization include the majority of the planning, policy making and enterprise-wide concepts. From these, there is a natural flow into the program execution of the remaining sections," says Soto.

Becky Winston, responsible for strategic planning for National Security, echoed these concepts of planning and execution. "Last year, National Security was tasked with developing several strategic plans. This year, we need to execute them."

The National Security Division is responsible for the direct execution of Critical Outcomes listed throughout the PEMP. But as with every division and organization, it is only through integration and cooperation that overall INEEL success will be achieved.

The PEMP for fiscal year 2001 is in final stages of completion. Once signed and sealed, it will be loaded onto the Intranet where interested employees can read it. National Security employees are urged to take a look and to see how the Division is measured and how the work you do fits into the overall plan.



NEED TO KNOW *is a publication of the National Security Division of the Idaho National Engineering and Environmental Laboratory. The INEEL is a science-based, applied engineering national laboratory dedicated to supporting the U.S. Department of Energy's missions in environment, energy, science and national security. The INEEL is operated for the DOE by Bechtel BWXT Idaho, LLC, in partnership with the Inland Northwest Research Alliance. Requests for additional copies, story ideas or questions should be directed to the editor at (208) 526-1058, kzc@inel.gov. This is printed on recycled paper.*

Editor ..... Kathy Gatens
Graphic artist ..... David Combs
Photographers .. Mike Crane, Norm Free, Ron Paarman
Copy editing ..... Rick Bolton